



New Hampshire Geological Survey's Annual Geologic Mapping Workshop 2015

Thursday April 16, 2015

9:00 AM – 12:30 PM*

DES Auditorium, NHDES, Concord

29 Hazen Drive, Concord, New Hampshire 03302-0095

Public Session Agenda

8:30 – 9:00 AM **Coffee and Poster Session in Auditorium Anteroom****

9:00 – 9:10 **Welcome and NHGS Program Update**
Rick Chormann, NH State Geologist

Guest speakers:

9:10 – 9:30 **Neil Olson, New Hampshire Geological Survey – “Coastal Change Analysis Using Airborne LiDAR Data and Historic Aerial Photographs.”**
In order to assess the needs of beach nourishment projects along the coast of New Hampshire, a geomorphic change analysis was performed using repeat Light Detection and Ranging (LiDAR) surveys from four time steps between 2000 and 2011. Digital Elevation Models from each time step were created and subtracted at each time interval, creating a budget of sediment gain and loss for each time step. In addition, trends in shoreline position were measured using linear regression analysis of shoreline position as mapped from historical aerial photographs and LiDAR contours.

9:30 – 10:00 **Joe Kopera, Massachusetts Geological Survey – “Tectonostratigraphy and Structure of the Nashoba and eastern Merrimack terranes in Massachusetts”.**
Over a decade of STATEMAP-sponsored geologic mapping in eleven 7.5' quadrangles in east-central Massachusetts describe a new tectonostratigraphy for migmatitic gneisses of the Cambro-Ordovician arc complex represented, in part, by the Nashoba Formation. Modern structural analysis performed as part of this mapping describes a complex, multi-phase deformational history that is similar in style, if not crustal depth, to that observed in the adjacent Merrimack terrane to the West.

10:00 – 10:30 **Steve Arcone, U.S. Army Cold Regions Research and Engineering Laboratory – “Stratigraphic Genesis beneath Mirror Lake, New Hampshire: Turbidite Deposition within Gytja and Glaciofluvial Clinoflows Interpreted from Ground-Penetrating Radar Profiles.**
Ground-penetrating radar profiles recorded across small, Mirror Lake in West Thornton, New Hampshire, reveal a subbottom downward succession of Holocene

gyttja, glacial silt, glaciofluvial clinoforms, stratified diamicton and bedrock. Low water and sediment electrical conductivities allowed more than 30 m subbottom penetration. High dielectric permittivities show all sediments near or at saturation. A previously unknown glaciofluvial delta partially divided the subbottom into northwest and southeast basins prior to about 4000 B.P., after which decreased gyttja accumulation rates likely resulted from decreased stream input and not from focusing, as previously thought.

10:30 – 10:50 **Break (Posters)**

Meghan Arpino, UNH Department of Earth Sciences – “*Influence of High Resolution Topographic Data on Predicted Water Surface Elevation and Lateral Connectivity in the Suncook River.*”

Peter Thompson, UNH Department of Earth Sciences (retired) – “*Bedrock Geology of the Enfield 7.5’ Quadrangle, New Hampshire.*”

Carol T. Hildreth – “*Surficial Geology of the Woodstock 7.5’ Quadrangle, New Hampshire.*”

Brian K. Fowler, Mount Washington Observatory – “*Surficial Geology of the Stairs Mountain 7.5’ Quadrangle, New Hampshire.*”

10:50 – 11:10 **Woodrow Thompson, Maine Geological Survey (retired) – “*The Deglaciation Sequence and Correlation of Moraine Complexes in the Northern White Mountains, New Hampshire, using LiDAR Imagery.*”**

A belt of prominent moraines in the northern White Mountains includes the Littleton-Bethlehem, Beech Hill, Randolph, Berlin, and Androscoggin moraine complexes. Recent studies support an Older Dryas age (ca. 14 cal ka) for the Littleton-Bethlehem and Beech Hill moraines. The Randolph moraines probably are the same age, but the deglaciation chronology farther east remains uncertain. Thompson et al. (2007) proposed correlation of the Randolph complex with the Berlin moraines in the Upper Ammonoosuc River basin. However, Bromley et al. (2013) obtained ^{10}Be cosmogenic ages of 12.9-14.1 ka with a mean of 13.5 ± 0.5 ka from boulders on the Androscoggin Moraine, southeast of Berlin on the Maine-New Hampshire border. These ages suggest the more proximal Berlin moraines should be even younger. Our study points to a different conclusion. Lidar imagery from the northern part of the White Mountain National Forest reveals additional moraines in the Berlin complex and other features that clarify the deglaciation history of this densely forested area.

11:10 – 11:40 **Dykstra Eusden, Michelle Devoe, Graham Oxman, and Sarah Xiao – Department of Geology, Bates College – “*Bedrock Geology of the Mount Dartmouth 7.5’ Quadrangle, New Hampshire.*”**

The Mount Dartmouth 7.5’ Quadrangle, located in the White Mountain National Forest of Northern New Hampshire was last mapped at 1:62,500 by Billings et al. (1946). Lyons et al. (1997) reinterpreted the bedrock geology of the quad as a part

of the Bedrock Geologic Map of New Hampshire. The purpose of this study was to produce an updated, detailed bedrock map and cross section at a scale of 1:24,000 to better define and evaluate the igneous rock types and metamorphosed stratigraphy of the area. The quad was mapped as part of a coordinated EdMap/StateMap project with the NHGS over the 2014 field season using digital mapping techniques.

- 11:40 – 12:10 **Greg Walsh, US Geological Survey – “Status Report of Bedrock Geologic Mapping by the USGS in New Hampshire.”**
This talk will present the results of ongoing mapping as part of the FEDMAP component of the USGS National Cooperative Geologic Mapping Program. Work is primarily focused in the Connecticut River Valley region in a four-quadrangle area around Littleton and an eight-quadrangle-area from Lebanon to Alstead. The discussion will focus on advances in our knowledge of the evolution of the Bronson Hill anticlinorium, insight gained about digital mapping procedures including implementation of the NCGMP09 data model, and new field tools for digital data acquisition.
- 12:10 – 12:20 **Woodrow Thompson, Maine Geological Survey (retired) – “Surficial Geology of the Sugar Hill 7.5’ Quadrangle, New Hampshire.”**
Surficial deposits in the Sugar Hill Quadrangle include a widespread mantle of till, overlain in valleys by glacial to postglacial sand and gravel. Ice-dammed glacial Lake Franconia was impounded in the north-sloping Ham Branch valley. This lake initially spilled southward into the Wild Ammonoosuc River valley, but ice retreat opened progressively lower outlets that drained the lake west into the Ammonoosuc River and ultimately into the lower Gale River. Sudden drops in lake level carved deep rock-walled ravines such as “The Gulf” in Lisbon. Other water-laid deposits in the quadrangle include large alluvial fans (sourced from steep western slopes of the Kinsman Range) on the east side of Ham Branch valley and a prominent Lake Hitchcock delta with adjacent stream terraces along the Ammonoosuc River in the northwest corner of the map area.
- 12:20 **Questions and closing remarks**
Rick Chormann, NH State Geologist
- 1:15 – 3:15 **Private Working Session for NHGS Mappers in Room 110**
Mapping contractor meeting for those who map for the NHGS under the STATEMAP program.

Directions to NH Department of Environmental Services
The main offices of DES (including the New Hampshire Geological Survey)
are located at 29 Hazen Drive, Concord, NH.

From the South and West

Take I-93 north to Exit 14 turning right at the end of the exit ramp. At the third light (at top of the hill), turn left onto Hazen Drive. Turn left at sign for Health & Human Services. Visitor parking is available in front of building.

From the North

Take I-93 south to Exit 15E onto I-393. Take Exit 2 and turn left at end of exit ramp (East Side Drive). Stay to the right and turn right at light onto Hazen Drive. Turn right at sign for Health & Human Services. Visitor parking is available in front of building.

From the East

Take Route 4 west to Concord (Route 4 becomes I-393 in Concord). Take Exit 2 and turn left at end of exit ramp. Stay to the right and turn right at second light onto Hazen Drive. Turn right at sign for Health & Human Services. Visitor parking is available in front of building.

Note: If you have not already done so, please respond by email if you plan to attend so that we can anticipate the number of attendees. If you need further information on the program or to R.S.V.P., please contact the NH Geological Survey at: geology@des.nh.gov

Attendance at the entire public session part of the workshop qualifies for 3.5 CEU's

Please bring photographic identification (e.g. driver's license) in order to be admitted to the DES Building. Thank you.

* NHDES employees should confirm their attendance and schedule of the workshop with their supervisors.

** Posters will be on display until the end of the public session of the workshop.